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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/816,612 | 04/02/2004 | Wen Chin Lin | TSMC2003-0937(N1280-00160 | 9794 |

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| EXAMINER | |
|---|---|
| NGUYEN, KIET TUAN | |
| **ART UNIT** | **PAPER NUMBER** |
| 2881 | |

DATE MAILED: 12/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/816,612 | LIN ET AL. | |
| | Examiner | Art Unit | |
| | Kiet T. Nguyen | 2881 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) 1-32 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-3,5-15,17-25 and 27-32 is/are rejected.

7)☒ Claim(s) 4,16 and 26 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 4/2/04.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

***Rejection Under 35 U.S.C. 112, Second Paragraph***

Claims 13-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 13 is indefinite for reciting the limitation "I" in line 4. What is the I?

Claim 21 is indefinite for reciting the limitation "80 to 110 degree" in line 2. Since the specification discloses "80 to 100 degrees" (see [0017]).

***Rejection Under 35 U.S.C. 102(e)***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 5, 10-15, 17-18, 23-25, 27-29 and 31-32 are rejected under 35 U.S.C. 102(e) as being anticipated by Wang et al. (US 2005/0077485).

Wang et al. (US 2005/0077485) disclose, in figs. 1-6d, a system and method for passing high energy of charged particles through a mask. The system includes a source for generating high energy of charged particles such as protons; sources/detectors 310 for aligning the mask 300 having alignment marks 302 to a target wafer 512; and a rectangular opening 304 of the mask 300. The charged particles have a energy level of 1-5 MeV exceeding a predetermined threshold for transforming semiconductor material

in selected areas to a higher resistivity (being semi-insulating areas or non-conducting areas) than other areas that are not exposed to the charged particles (see [0029]). The mask is designed to short the distance between the mask and the wafer (see [0032]).

***Rejection Under 35 U.S.C. 103(a)***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 6-9, 19-22 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. (US 2005/0077485).

Wang et al. (US 2005/0077485) disclose all the features as discussed above except unremoving center portions of openings of mark patterns as recited in claims 6, 19 and 30; the silicon wafer mask having a thickness between 100 to 800 um as recited in claims 8 and 20; an angle between sidewalls of the mask patterns and the surface of

the mask is between 80 to 100 degrees as recited in claims 9 and 21; and the fluence of the charged particles being between 1E14 ea/cm² to 1E17 ea/cm² as recited in claim 22.

Making the mask having unremoved center portions of openings of mark patterns, a thickness between 100 to 800 um, an angle between sidewalls of the mask patterns and the surface of the mask is between 80 to 100 degrees and the fluence of the charged particles being between 1E14 ea/cm² to 1E17 ea/cm² is considered to be obvious variation in design, since the unremoved center portions of openings of mark patterns and the angle between sidewalls of the mask patterns and the surface of the mask is between 80 to 100 degrees are well known in the art as shown in Suzuki (6,563,125), the thickness of the silicon mask being between 100 to 800 um is also well known in the art as disclosed in Okino (6,362,489) (see col. 6, lines 25-42), and since the number of charged particles passed through the opening of the mask is dependent on the area of the opening of the mask for making the circuitry, thus would have been obvious to one skilled in the art to make the silicon mask having unremoved center portions of openings of mark patterns, a thickness between 100 to 800 um, an angle between sidewalls of the mask patterns and the surface of the mask is between 80 to 100 degrees and openings for the fluence of the charged particles being between 1E14 ea/cm² to 1E17 ea/cm² in the Wang et al. (US 2005/0077485) system for passing the charged particles through the mask to land on the wafer for making the circuitry.

Claims 4, 16 and 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Reasons for indicating allowable subject matter***

The prior art fails to disclose a method and/or system for passing charged particles on selected areas on a wafer, which includes means for bonding a semiconductor wafer with a wafer mask as recited in claims 4, 16 and 26.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1) Yamashita (6,323,500) discloses an electron beam exposure system having a mask with an unremoved center portion of opening;

2) Okino (6,362,489) discloses an electron beam exposure system having a mask with a thickness of 800 um;

3) Suzuki (6,563,125) discloses an electron beam exposure system having a mask with an unremoved center portion of opening;

4) Wolfe et al. (6,624,429) discloses an electron beam exposure system having a mask disposed approximate a wafer; and

5) Li (6,852,988) discloses an electron beam exposure system having means for adjusting a gap between a mask and a wafer.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kiet T. Nguyen whose telephone number is 571-272-2479. The examiner can normally be reached on Monday-Friday 8-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R Lee can be reached on 571-272-2477. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KN

KIET T. NGUYEN
PRIMARY EXAMINER